

# School of Electronic Engineering and Computer Science

## Final Year Project Handbook

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# 1 The Goal of the Final Year Project

The final year project allows students to demonstrate the knowledge, skills and experience they have gained during the degree programme and to extend these by working individually on a research or development problem. CS and EE are both practical subjects, and potential employers are typically very interested in the project, as it is the key means by which any student can demonstrate their ability to “do” CS or EE.

In addition to technical skills the project will also involve communication skills, organisational and time management skills

The work will be guided by a supervisor and will be expected to occupy at least a quarter of a student’s effort in the final year of the programme.

## 2 Project support

There will be series of lectures given by the project coordinator to support you in your project. There is also an area on QMplus where the lecture slides can be found and other supporting material.

There is a forum on QMplus for the projects where discussions can take place. This will be monitored by the project coordinator, who will answer questions if this seems useful. The project coordinator will also be available in the office hours that are posted to discuss general logistical issues about your project.

## 3 Selecting a project and supervisor

Towards the end of the second semester in your penultimate year a list of project supervisors with their areas of interest will be published as a web page. There will also be as session at which supervisors can give brief descriptions of the types of project that they will be offering.

You will then be able to make appointments with supervisors to discuss possible projects. If you agree to work with a supervisor he/she will claim you. This process will last until the end of the second week of the first semester of your final year. If you have not been able to agree a supervisor by this time you will be allocated to a supervisor. Supervisors have a quota of project students and the number of vacancies for taking on students will be updated on the web page as students are claimed. Changing supervisors, once you have one, needs the agreement of your old and new supervisors.

## 4 Types of Project

Most students will work on an implementation project, but there are other possibilities. In addition to projects suggested by a supervisor you can suggest your own project, but in this case you need to find a supervisor who is willing to supervise the project and who considers that the level of difficulty of the project you have suggested is appropriate.

## **4.1 Implementation**

Implementation projects may be hardware based, software based or a combination of hardware and software. An implementation project will involve all the normal stages of development: specification, design, implementation and testing.

## **4.2 Research**

A research project must be based on technology and must be a genuine research task. It must be original work, for example a review of work in an area or just a business analysis would not normally be acceptable research projects.

## **4.3 Industrial**

An industrial project would be one that was carried out in cooperation with an external business. There needs to be a named supervisor from the industry as well as an academic supervisor from the school.

Industrial projects may originate from contacts that academic staff have industry or from contacts that the student has developed. It is the responsibility of the academic supervisor to ensure that the level of difficulty of the project is appropriate.

## **4.4 Experimental**

An experimental project would typically be a user study or an experimental evaluation. It would normally include some implementation, e.g. building a prototype.

# **5 Project supervision**

## **5.1 Keeping in contact with your supervisor**

It is important to meet with your supervisor regularly. Different supervisors have different ways of organising meetings – either individually or as group. If your project is not going well, tell your supervisor about it and definitely do not stop going to meetings.

If you have a particular issue that you cannot deal with in a regular meeting, email your supervisor for an appointment. It is likely that your supervisor will sometimes be away at research meetings or other events, so keep a note of these.

Keep a logbook for your project and record your progress, meetings with your supervisor, difficulties etc. in this book. It will help you to record issues you want to discuss with your supervisor when you meet and the logbook will be very useful when you are writing reports.

## **5.2 Student responsibilities**

You need to monitor the project progress. Your role is something like a project leader whereas the supervisor's role is more like a consultant and manager.

You need to maintain regular contact and arrange appointments with your supervisor.

It is your responsibility to gain the knowledge required and deal with implementation details. It is not the responsibility of the supervisor to provide ready-made solutions. You need to formulate the problems before asking your supervisor.

It is important that you are self-motivated. You should not expect that you will be spoon-fed by your supervisor.

You need to tell your supervisor about any equipment failure, technical or other difficulties that will interrupt your work.

### **5.3 Supervisor responsibilities**

It is the supervisor's responsibility to define the project objectives and the possible outcomes, or to refine these and check whether they are adequate if you have suggested your own project.

The supervisor will provide advice and guidance but leave solutions and implementation details to the student. The supervisor will explain what resources (hardware and software) are available to the students and be available to the student for consultation.

The supervisor will explain the project assessment method to the student and be responsible for evaluating the student's project in terms of quality and quantity of the effort expended.

The project title and specification are a joint responsibility of the supervisor and student. The supervisor is responsible for assessing the interim report and will be one of the assessors for the final outcome of the project.

## **6 Project Outputs and weighting**

### **6.1 Project weighting**

The overall weighting of your project in the calculation for your final degree is different for the two parts of the School.

#### **6.1.1 Computer Science students**

For Computer Science students the project counts as two modules in the final year and is therefore 25% of the final year mark or 15% of the overall degree classification. You must pass a "problem-solving project" at the first attempt to qualify for partial exemption from the BCS membership examinations. A poor project mark will obviously impact on your overall mark for your degree classification, but failing the project does not affect obtaining a degree or degree title.

#### **6.1.2 Electronic Engineering students**

For EE students the project is 20% of the overall degree classification. This was a requirement of the IET accreditation of EE programmes and makes the project 33.3% of the final year mark for the three-year degree and for the MEng programme 53.3% of the final year mark. BEng and MEng degrees require a pass in the project and project

failure would either require a resit of the project or the award of a BSc(Eng) degree for BEng students.

## 6.2 Project documentation

There are two documents that you need to produce during your project and at the end you will need to submit the final project report and your slides for your presentation.

The documents required are:

- Specification including a time plan
- Interim report including a revised time plan and a risk assessment
- Final report
- Presentation slides

## 6.3 Weighting of project elements

The weightings are as follows:

Project Element	Assessed by	Weighting
Specification and time plan	Not assessed but approved by supervisor	0%
Interim report and risk assessment	Supervisor	5%
Final report, code listing and implementation	Supervisor and another member of academic staff	85%
Presentation, demonstration and questions	Supervisor and another member of academic staff	10%

More detail of the assessment of the final report, code listing and implementation will be given in section 15.

# 7 Resources

## 7.1 Hardware

There is an area of the electronics laboratory for project hardware development and you can request to be allocated a cupboard space in the lab to keep your hardware and work on your project.

The lab provides a supply of basic electronic parts and you can take parts from the carousel in 253. For other specific parts you must request that an order form is created. The Lab Manager can authorise purchases up to £15, your supervisor up to £50 and above £50 the project coordinator must authorise. The total maximum budget per project is £100. Check whether we have parts already before you order anything and we prefer that parts can be re-used.

Be careful about the package that integrated circuits use. Standard DIL packages are good for development on breadboard and strip board, but surface mount parts must have adequate adapters or fabrication of a suitable PCB must be considered before purchasing. If you need to have a PCB manufactured also see the PCB technician to discuss complexity and lead times for manufacture. All purchasing and fabrications need to have been authorised appropriately before purchase or works are commenced.

You can check a general guide to the items stocked in the lab at:

<http://services.eecs.qmul.ac.uk/eecs-laboratories/electronics-labs/components/>

All components not available in the carousel still need to be ordered, even if stocked.

To request a cupboard/order form email [electronicslab@lists.eecs.qmul.ac.uk](mailto:electronicslab@lists.eecs.qmul.ac.uk) and copy your supervisor.

If you are using microcontrollers check that we have access to a software development environment and programming capability for your chosen part.

For more information about the electronics lab see <http://services.eecs.qmul.ac.uk/eecs-laboratories/electronics-labs>.

## 7.2 Software

Final year students have access to all ITL floors when there are no scheduled labs (check lab timetable via your landing page). Even when there are labs, you may be able to access the unused machines. However you must always be considerate of labs that are running in the ITL.

All the software you need should be available, but if you think you need something else please consult the support staff and your supervisor.

# 8 Ethics and projects that involve human participants

The obvious ethical issues are fraud (e.g. passing off work that was done by someone else as your own) and plagiarism (which will be discussed further in section 9.4).

However, projects that involve human participants, e.g. user studies or experimental evaluations, also involve ethical issues. The principal issues are ensuring that participants have given informed consent and ensuring that personal details are protected in accordance with the Data Protection Act. If your project involves human participants please discuss these issues with your supervisor.

# 9 Referencing and Plagiarism

## 9.1 Referencing

There are standard ways of referring to documents that you have accessed when you want to show the source of the information in your reports. The two main varieties are



systems where the author's name and year appear in the text that links to a list at the end of the document (typically the Harvard system) and systems where a number appears in the text as a superscript or in brackets that links to a list at the end of the document (e.g. the IEEE system). You can use either, but the Harvard system is preferred.

## 9.2 The Harvard system

### In the text

In his recent article, Leyden (2005) claimed that...

Google's new IM service has had a less-than-enthusiastic reception (Leyden 2005)

"Early reaction to the service has been lukewarm." (Leyden 2005)

Reid and Dunlop (2003) stated that...

Beymer et al (2005) stated that... (3 or more authors)

Fig. 1. Audio classification framework (Divakaran 2004, p.29)

### Web references

Leyden, J. (2005) Google Talks Up IM Service. The Register [on-line]. Available from [http://theregister.co.uk/2005/08/24/google\\_talk/](http://theregister.co.uk/2005/08/24/google_talk/) [Accessed 7 November 2014]

Department of Health (2006). Fluoridation of drinking water [online]. Available at: <http://www.dh.gov.uk/assetRoot/04/13/60/15/04136015.pdf> [accessed 13/9/2006].

### Book reference

Naisbitt, J. (1984). *Megatrends*. New York: Warner Books.

### Periodical (journal) reference

Raikkonen, K., Pesonen, A.K., Jarvenpaa, A.L. & Strandberg, T. E. (2004). Sweet babies: chocolate consumption during pregnancy and infant temperament at six months. *Early Human Development*, 76 (2), 139-145.

### Conference proceedings reference

Beymer, D., Russell, D. and Orton, P. (2005) Wide vs. Narrow Paragraphs: An Eye Tracking Analysis. **In:** Costabile, M.F. and Paternò, F. eds. *Human-Computer Interaction – INTERACT 2005. Proceedings of the Tenth IFIP TC13 International Conference, LNCS. Vol. 3585*. pp. 758 - 792. Heidelberg: Springer-Verlag.

## 9.3 The IEEE system

### In the text

A population of forty-two was accepted as statistically significant [43].

## The reference

[43] van Dort, M., Beerends, J.G., van den Brink, W., Loose, M., Contin, L., “Comparison of three subjective video quality assessment methods”, *RACE Mobile Telecommunications Summit, Cascais, Portugal*, November 1995.

Full details at

[http://www.ieee.org/publications\\_standards/publications/journalmag/IEEE\\_style\\_manual.pdf](http://www.ieee.org/publications_standards/publications/journalmag/IEEE_style_manual.pdf) [accessed 11-11-2016]

## 9.4 Plagiarism

Plagiarism effectively means presenting the work of others without stating where it has come from (sourcing), or to put it simply, trying to pass off someone else’s work as your own. The formal definition from the College is:

**“ QMUL defines plagiarism as presenting someone else’s work as one’s own irrespective of intention. Close paraphrasing; copying from the work of another person, including another student; using the ideas of another person without proper acknowledgement; and repeating work that you have previously submitted – at QMUL or at another institution - without properly referencing yourself (known as ‘self plagiarism’) shall also constitute plagiarism.”**

Unfortunately, including material without proper acknowledgement has become far too common and the College takes a very firm line on any such offences.

If you are suspected of plagiarism you will be reported to the Academic Registrar for an examination offence under the College *Regulations for Assessment Offences*. Under these Regulations students found to have committed an offence may have their whole diet of assessments invalidated or be expelled from the College.

A range of methods, including special software tools, is used to detect plagiarism and project reports are routinely put through these tests.

# 10 Time Management

Managing your time over the two semesters is an important part of your project. You have a time plan, but this has to be vague as you have little experience of how long things will take. Take time to research, read, think and discuss with others before diving in.

Plan for slippage and have a contingency plan. Revisit and review your plans and progress regularly. Do not lie to yourself - or anyone else - about your progress! It does not help you.

Make sure you are aware of the many deadlines and demands you will have during the course of this year and budget for these issues in your time plans.

An important issue is the balance between the project and other modules. You want to do well in all your final year modules.

Steady work throughout the period is important for success in your project. You cannot leave most of the work until the last month. Remember to leave enough time to write your final report, as this will be very important in how your success is judged.

## **11 Specification and time Plan**

### **11.1 Specification**

Your final achievements in your project will be judged against your specification. It is possible to amend the specification during your project, but you will need to keep a record of any changes and the reasons for the changes. Any changes must be agreed with your supervisor.

Exactly what will appear in your specification will vary with the nature of your project, but typical items will be:

- The project title;
- Details of the specific problem being addressed;
- An initial analysis of user requirements and data collection methods;
- The algorithms, methodologies and techniques to be employed;
- An initial specification of how users will interact with the system;
- Programming languages, software, hardware, databases;
- A list of background materials consulted so far, including Internet resources.

Your specification must be agreed with your supervisor. A pro forma is provided for you to use when writing your specification.

### **11.2 Time plan**

Your time plan should break down the work you expect to carry out for your project into activities (tasks and sub-tasks) and estimate how long each will take, whether one relies on the completion of another or can be carried out in parallel etc.

The deadlines that you have for producing documents and the final demonstration should also appear on the plan.

The format can be a Gantt chart or a list of activities and their start and end dates.

You will be asked to revise the time plan when you submit your interim report so the first semester plan could have much more detail than the second semester plan. The plan should also be agreed with your supervisor.

## 12 Interim Report and Risk Assessment

### 12.1 Interim Report

The interim report is an opportunity for you and your supervisor to review the progress that you have made. It will also provide input for your final report.

It should consist of

- The review of previous work and the background to your project.
- An account of your achievements to date.
- An amended plan for the work you will carry out in the second semester.

This report will be marked by your supervisor and count 5% towards your final project mark.

### 12.2 Risk Assessment

The risk assessment should consist of a list of the risks to the successful completion of your project, the impact of the risk, the likelihood of the risk occurring, the severity of the effect of the risk on your project and how you intend to manage the risk.

This should be presented in the form of a five-column table. The ratings will be low/medium/high.

Description of risk	Impact of risk	Likelihood rating	Impact rating	Preventative actions

Some of the risks in hardware construction will be physical risks associated with construction activities.

The document should be submitted electronically via the School submission system.

## 13 Final Report

The purpose of your report is:

- to describe the project to the examiners
- to “sell yourself” by bringing out the best of what you have achieved
- to show that you have evaluated your work and know the successes and limitations.
- to demonstrate that you are capable of a sustained piece of writing.

You are required to submit a draft version of your final report to your supervisor (see deadlines) so that you can get feedback to improve the final submission.

The structure will vary depending on the nature of the project, but for most projects there should be an introduction justifying the usefulness of the project, a review of previous work on the topic, a requirements section, a design section, an implementation section, a testing section, conclusions, suggestions for further work and references. There is a template provided and in more detail the structure should be:

**Title page** – template will be provided

**Acknowledgements**

**Abstract / summary**

One page maximum that should be a complete summary of your work, which makes sense without reading the rest of the report.

**Table of contents**

**Introduction**

Context for report and the motivation for your work

**What others have done chapters**, e.g.

Background research and a literature review.

**What you have done chapters**, e.g.

Requirements capture / analysis – what your system should do

Design – how you went about your work

Implementation – practical techniques, problems, solutions

Testing and/or evaluation – how well your solution worked

**Discussion / conclusions**

This should be a critical analysis of your work and an honest appraisal of the achievements of your project.

**Further work**

What more you would do if you had time.

**References / bibliography**

**Appendices**

More detailed material that is not crucial to understanding of main message(s), e.g.

Detailed experimental results

Data sheets if the parts these are important to explain your design

Copy of questionnaire / interview script

There is a limit of 50 pages without appendices or 60 pages with appendices. Use 12-point type and make sure that figures and tables have captions. Word or Latex can be used for the document.

Submission is electronic via the School system and Turnitin will be used on submissions, so it is worth making a trial submission via Turnitin to see if the system spots problems with your report.

Your computer code in text format should be submitted as a separate file.

## 14 Presentation and Demonstration

You will be allocated a 30 minute slot to present what you have done to the examiners.

The presentation slides must be submitted in advance according to the deadlines in PowerPoint or pdf format. Do not prepare too many slides for the time allotted, and do try to practice your presentation with a group of friends and colleagues.

You have 10-15 minutes for a presentation and 5-10 minutes to demonstrate your project. You must not exceed 20 minutes in total so that there are 10 minutes for the examiners to ask you questions.

The objectives of the session are

- For you to explain and justify your work
- To demonstrate what you have achieved
- To impress and interest your examiners
- To show your ability to respond to questions about your project.

The time is tight, so you must rehearse both what you are going to say and what you are going to demonstrate. DO not assume that the second examiner will be an expert in the area of your project and think about likely questions you may be asked.

## 15 Final Assessment

Your supervisor and another academic will carry out the final assessment. The final report, demonstration, presentation and responses to questions all contribute to this assessment.

The assessment scheme for the 95% of the marks that are for your final project outputs is as follows:

Demonstration / viva	10%
Background, aims, and organisation	17%

Achievement	26%
Clarity	12.5%
Analysis / testing	17%
Difficulty level and Supervision	12.5%

## 16 Deadlines 2016/17

Agreeing a supervisor	10 October 2016
Specification and time plan	31 October 2016
Interim report and risk assessment	9 December 2016
Draft final report	20 March 2017
Final report	24 April 2017
Presentation slides	26 April 2017
Demonstration and presentation	2 to 12 May 2017

## 17 Office Hours 2016/17

The coordinator will be available via Skype (ID [alan.pearmain@qmul.ac.uk](mailto:alan.pearmain@qmul.ac.uk)) on Mondays and Thursdays between 12 noon and 1 pm.